AMENDMENTS TO THE SPECIFICATION

Please amend paragraph 0007 as follows:

[0007] **Figure 1** illustrates an embodiment of a structure ~~subject~~ subjected to imaging;

Please amend paragraph 0010 as follows:

[0010] **Figure 4** is a flow chart ~~illustrated~~ to illustrate an embodiment of image segmentation;

Please amend paragraph 0022 as follows:

[0022] **Figure 1** illustrates an embodiment of a structure ~~subject~~ subjected to imaging. Figure 1 contains a simplified model for purposes of explanation. Figure 1 shows a particular wire structure **110** that is present in a microelectronic device and an image of this device with noise **120**. In this illustration, the structure is intended to represent a wire with a T-junction, with the lighter colored wire being presented on a darker silicon background. In actual images, the noise level for the image may be high and the structure may be much more difficult to discern. Under an embodiment of the invention, the image **120** is segmented according to models of structures. In this example, the structure is segmented according to geometric models of wiring structures that are expected to found in the image.

Please amend paragraph 0026 as follows:

[0026] Under an embodiment of the invention, a branch and bound algorithm is used to search for an optimal segmentation of an image. The algorithm uses a priority queue to store states, with each state being a set of segmentations. Each state is either a terminal state or a non-terminal state. When a terminal state reaches the head of the queue, the search is terminated. States are designated as terminal according to a certain precision standard. All other states are non-terminal states. When a non-terminal state reaches the head of the queue, the state is removed from the queue, and new states that are subsets of the removed state are then inserted in the queue. The states in the queue are prioritized by the bounds associated with them, and the state with the highest bound is placed at the head of the queue. For example, the priority may represent the contrast between the pixels inside a particular ~~segmentation~~ <u>segment</u> and the pixels outside the ~~segmentation~~ <u>segment</u>.

Please amend paragraph 0030 as follows:

[0030] Under an embodiment of the invention, an algorithm finds a segmentation that maximizes the function *l* over the set of ~~segmentations ***S***~~ <u>segmentations *S*</u>. In one possible example, the function *l* may represent intensity homogeneity, and maximizing *l* results in maximizing the contrast between pixels inside of a ~~segmentation~~ <u>segment</u> and pixels outside of the ~~segmentation~~ <u>segment</u>.

Please amend paragraph 0031 as follows:

[0031] Under an embodiment of the function, a refining function *R* breaks up sets of segmentations into smaller sets by mapping a set of segmentations into a

collection of sets of segmentations that form a partition of the original set. If a set *S* is a set of segmentations in the segmentation space ***S***, then *S* is partitioned into sets:

$$S \subseteq \boldsymbol{S}$$

$$[[R : 2^{S} \to 2^{2^{S}}]] \ \underline{R : 2^{S} \to 2^{2^{S}}}$$

$$S \to S_1, S_2, \ldots, S_l$$

Please amend paragraph 0032 as follows:

[0032] Under an embodiment of the invention, a partial segmentation function *M* will provide the set of all the ~~cells~~ <u>segments</u> that a pixel may be mapped to by a set of segmentations:

$$[[M : 2^{S} \times \mathbf{P} \to 2^{\{1,\ldots,K\}}]] \ \underline{M : 2^{\mathbf{S}} \times \mathbf{P} \to 2^{\{1,\ldots,K\}}}$$

Please amend paragraph 0033 as follows:

[0033] With *P* being the array or the set of all of the pixels in an image, for any pixel *p* ~~in a set *S* of segmentations~~ <u>and set of segmentations *S*</u>, the function *M* may be expressed as:

$$M(S, p)$$

Please amend paragraph 0036 as follows:

[0036] Under an embodiment of the invention, states are subsets of a segmentation space *S*. For any non-terminal state, the states that are immediately reachable from *S* are given by *R(S)*, which is the refinement of the segmentation set *S* into smaller segmentation sets. Using the functions provided above and assuming a partial

segmentation T is defined by $T(p) = M(S, p)$, representing the ~~cells~~ segments that p may be mapped to, the priority function L:

$$[[L : 2^S \rightarrow \mathrm{R}]] \ \underline{L : 2^S \rightarrow \mathrm{R}}$$

may be defined as:

$$L(S) = B(T)$$

In this equation, the function L provides a bound for any segment that is an element of the set that is the argument.

Please amend paragraph 0039 as follows:

[0039] (2) **Extraction from Queue -** The state at the head of the priority queue is extracted, this state initially being the set of all segmentations $\boldsymbol{S}$. The state is removed from the queue. If the extracted state is a ~~terminal queue~~ terminal state, the process is halted and the state is output as the solution to the optimization process. Otherwise, the process continues.